

CLAIMS

Claims 1-19 (Canceled)

20. (Previously presented) A microfluidic device comprising:

a circular disc which is adapted for rotation about its axis and comprises two substrates between which there are predetermined hydrophilic pathways for liquid flow, and a hydrophobic section within in a hydrophilic pathway to form a valve that provides a break in liquid flow passing through the pathway.

21. Canceled

22. (Previously presented) The microfluidic device of claim 20, wherein interior walls connecting the two substrates define the pathways.

23. (Previously presented) The microfluidic device of claim 20, wherein the device comprises an inlet towards the axis of the device.

24. (Previously presented) The microfluidic device of claim 20, wherein the device comprises a series of inlet ports arranged at spaced intervals around the axis.

25. (Previously presented) The microfluidic device of claim 20, wherein the device comprises an inlet for liquid towards the center and an annular outlet for liquids towards the circumference of the device.

26. (Previously presented) The microfluidic device of claim 20, wherein the pathways have dimensions enabling capillary forces to act upon the liquid within the channels.

27. (Previously presented) The microfluidic device of claim 20, wherein surfaces within a pathway have been treated to enable the culture of cells.

28. (Previously presented) The microfluidic device of claim 27, wherein the device further comprises a separate pathway containing a hydrophobic section and the pathway is a gas pathway or a sample inlet.

29. (Canceled)

30. (Canceled)

31. (Previously presented) A method of producing a microfluidic device having the form of a circular disc which is adapted for rotation about its axis, and comprising two substrates at least one of which controls flow of a liquid in the microfluidic device comprising the step of:

treating at least one substrate such that the surface of the treated substrate has hydrophilic pathways for liquid flow of the liquid and a hydrophobic section or valve within a hydrophilic pathway to prevent flow of the liquid.

32. Canceled

33. (Previously presented) The method of claim 31, wherein the microfluidic device comprises two parallel substrates for flow of liquids flowing in predetermined pathways between the substrates.

34. Canceled

35. Canceled

36. (Previously presented) The method of claim 31, wherein the pathways have dimensions enabling capillary force to act upon the liquid within the pathways.

37. Canceled

38. Canceled

39. Canceled

40. Canceled

41. (Previously presented) The method of claim 31, wherein treating the surface of at least one of said substrates is selected from the group consisting of masking and plasma treatment, applying a cross-linkable hydrophilic photoresist, adsorbing a crosslinkable

surface active polymer, adsorbing a polymerizable surfactant, applying photo-oxidation, and applying electron beams.

42. (Previously presented) The microfluidic device of claim 28, wherein the separate pathway is hydrophobic.

43. (Previously presented) A method for controlling flow of a liquid in a microfluidic device comprising the steps of:

adding the liquid to an inlet of the microfluidic device of claim 20, wherein the liquid flows down the hydrophilic pathway until the liquid reaches the hydrophobic section or valve in the pathway preventing the flow of liquid; and

applying sufficient energy to the liquid allowing it to pass the valve and continue to flow down the pathway.

44. (Previously presented) The method of claim 43, wherein the liquid flows down the hydrophilic pathway to the valve by capillary action.

45. (Previously presented) The method of claim 43, wherein the energy is centrifugal force created by rotating the device.

46. (Previously presented) The method of claim 43, wherein the liquid has a surface tension $> 18 \text{ mNm}^{-1}$.

47. (Previously presented) The method of claim 43, wherein the liquid is an aqueous solution or suspension having a surface tension $> 50 \text{ mNm}^{-1}$.